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(54) Motorised mount for a steerable dish antenna

(57) The mount, e.g. a polar mount, has a stationary portion formed by intermediate member 3, plate 15, and arm 21. A mount member 5 for rigid attachment to a dish antenna 8 is pivotally coupled to the member 3 of the stationary portion for rotation in a plane about an axis 6. First and second lever arms 31, 34 are pivotally coupled together at 33 and extend generally parallel to the aforementioned plane. The first lever arm 31 is additionally pivotally coupled at 32 to the mount member 5, and the second lever arm 34 is pivotally coupled at 35 to the stationary plate 15. A motorised actuator ram 23 is pivotally coupled between the second lever arm 34 and the stationary arm 21, thereby permitting the dish to be steered through a wide angle in use. A spring may act to bias the mount member towards a position which it occupies when the ram is retracted.

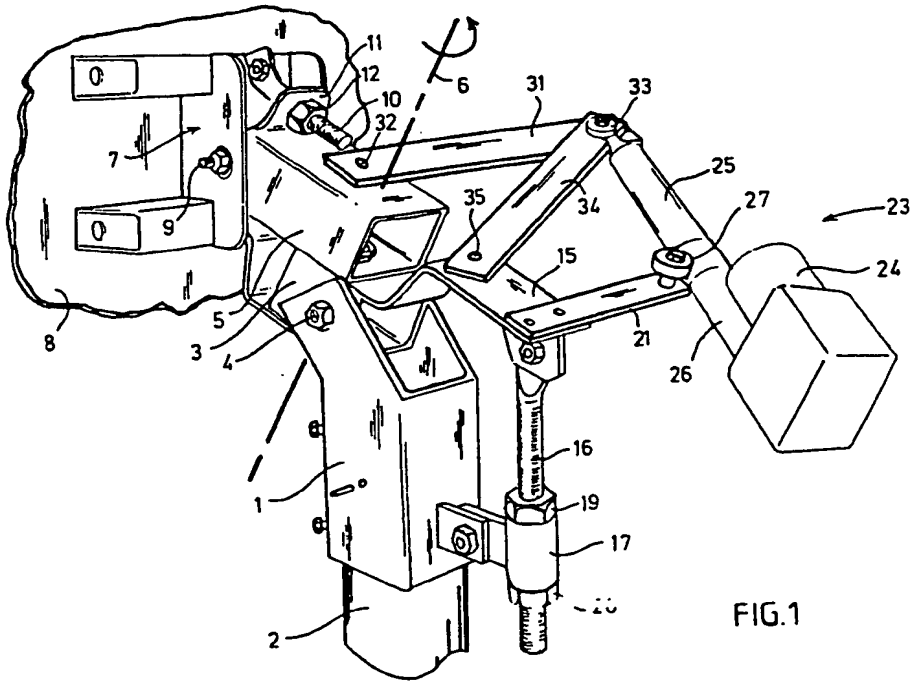

FIG.1

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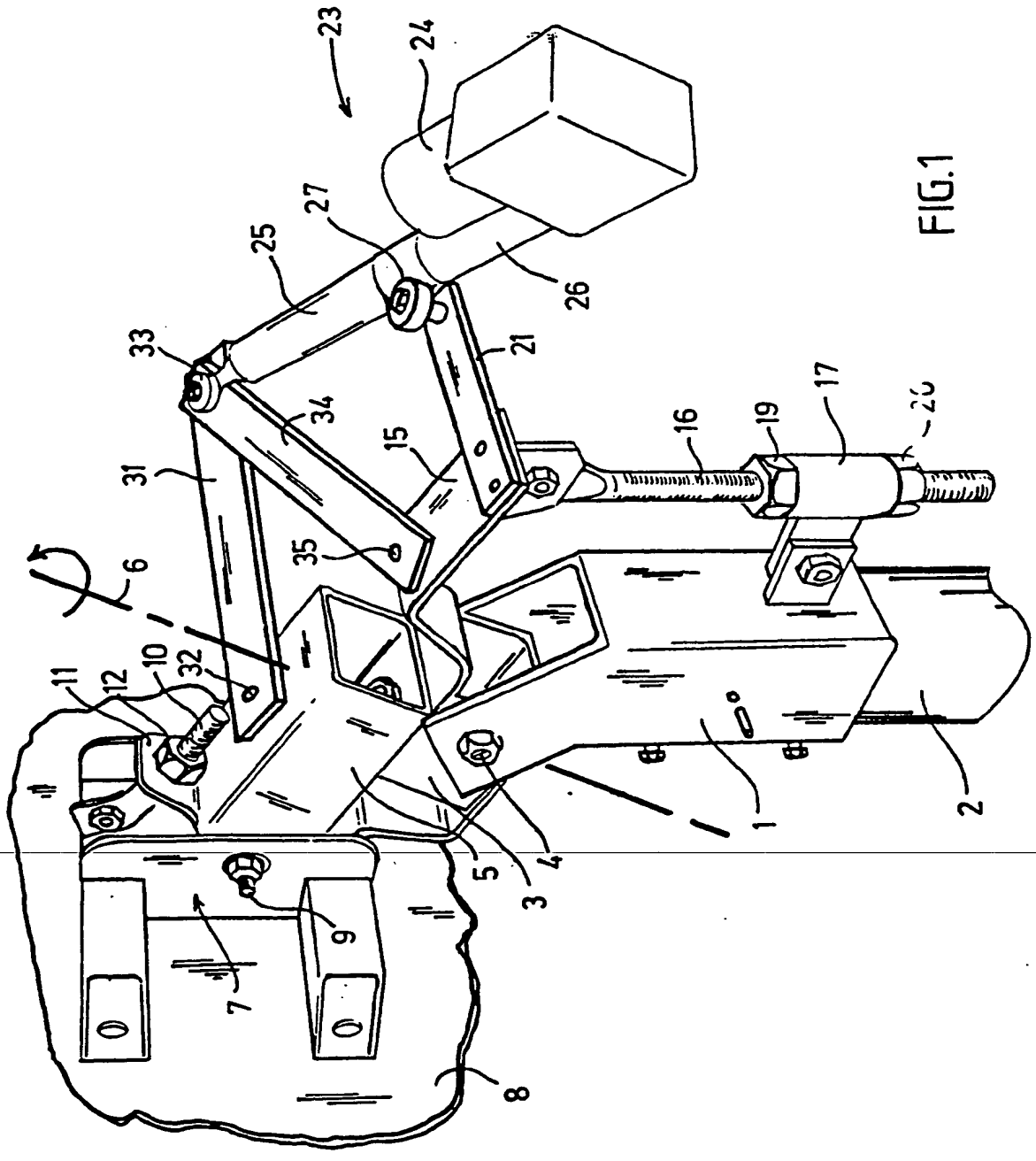

FIG.1

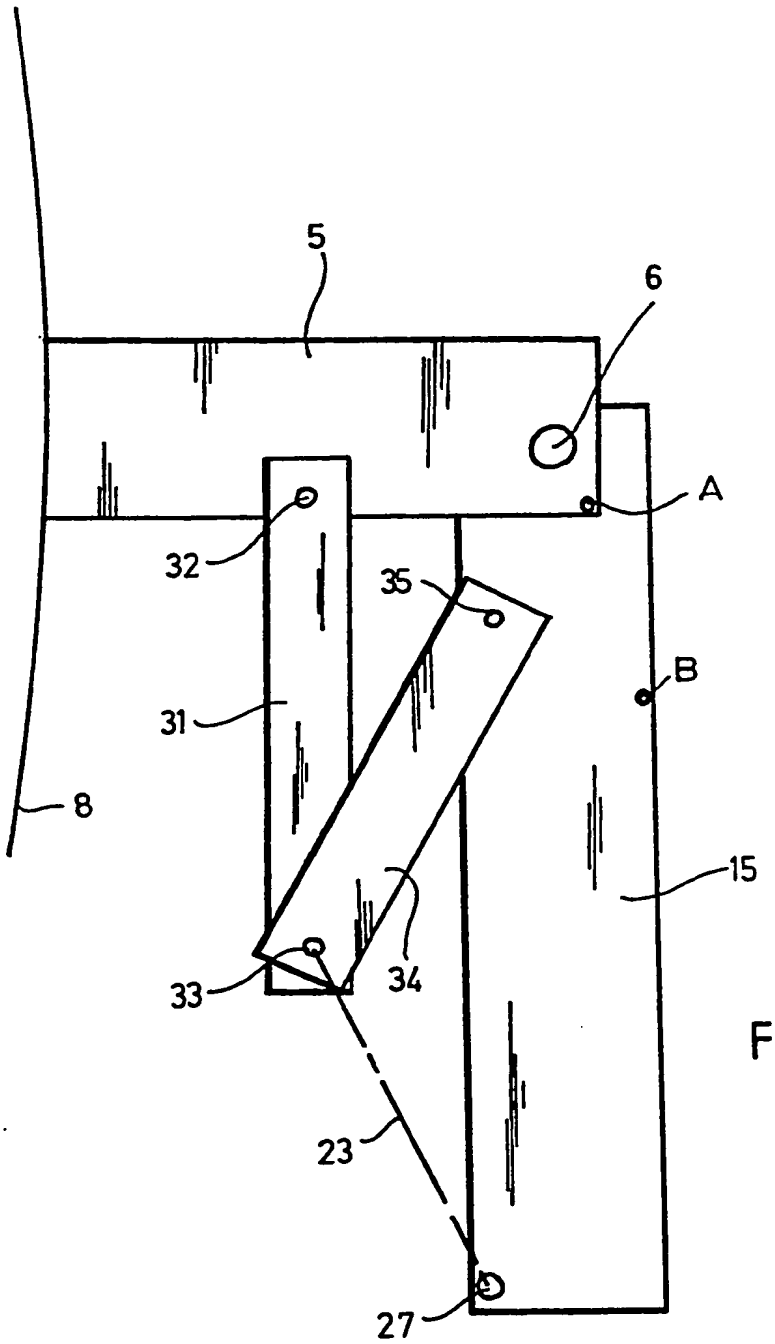

FIG.2

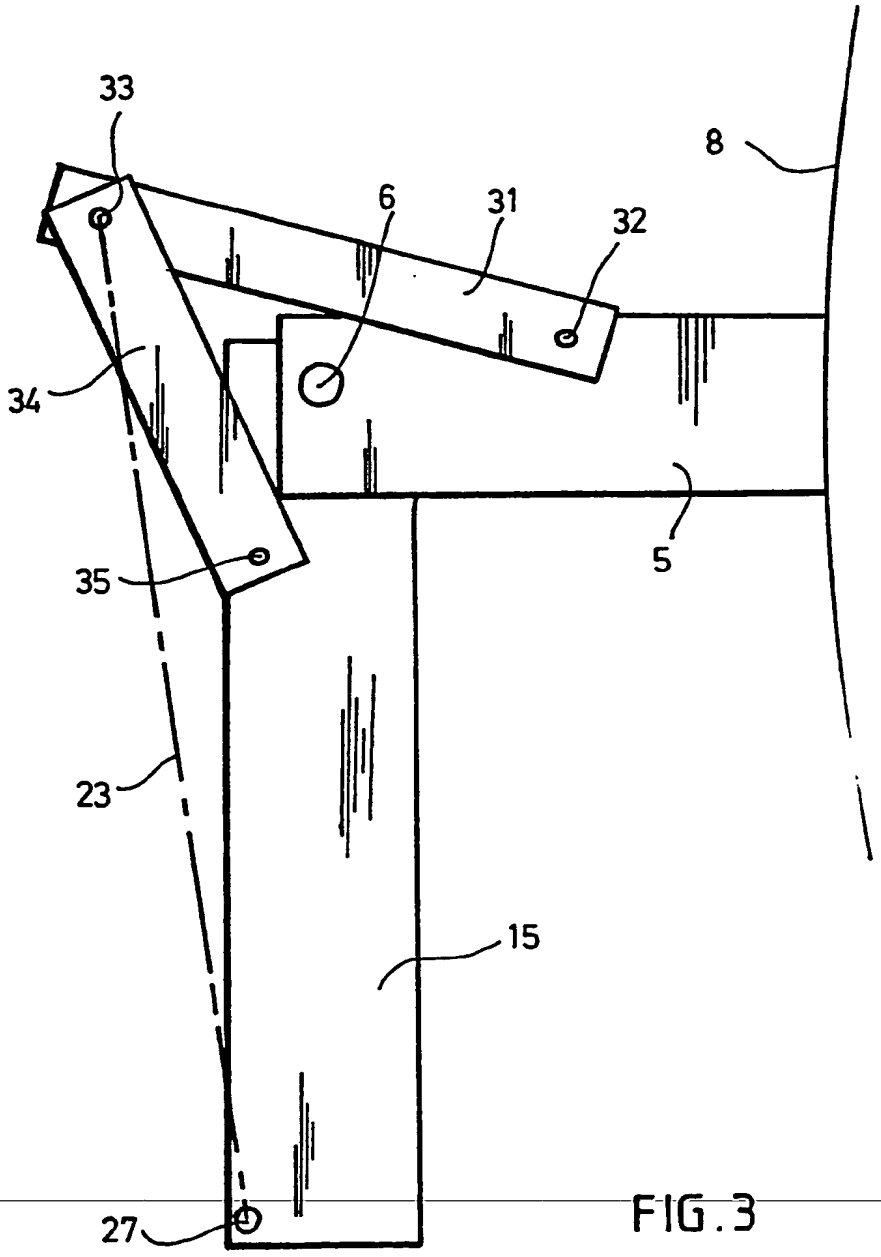

FIG.3

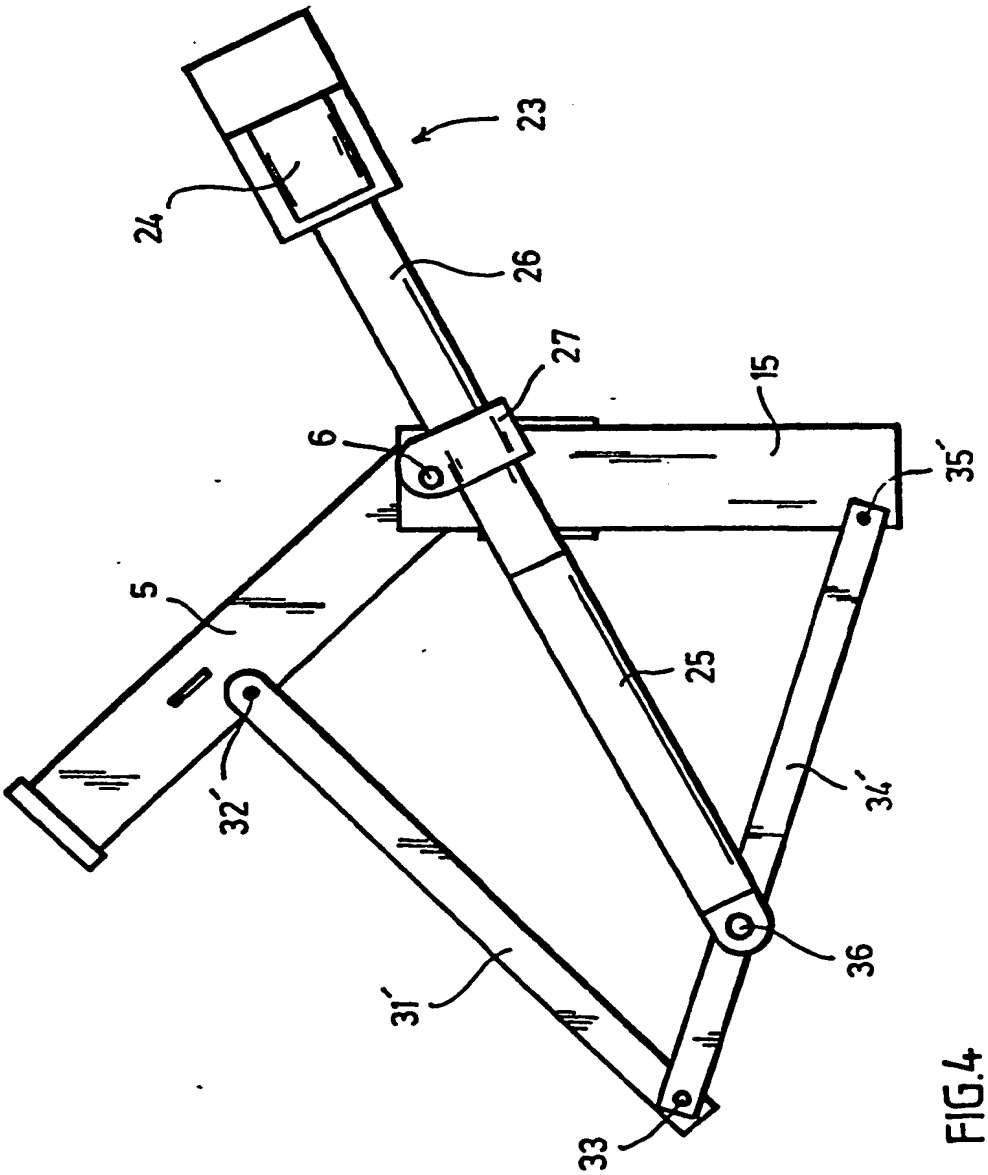

FIG.4

MOUNT FOR A DISH ANTENNA

TECHNICAL FIELD OF THE INVENTION

This invention is concerned with motorised mounts for steering small dish antennas (typically 1 to 1.5 metres in diameter), e.g. to receive television signals from different satellites.

BACKGROUND ART

In many existing mounts the dish is moved by a motorised actuator ram coupled directly between the antenna and a fixed portion of the mount, but the dish is usually only steerable through an arc of about 90 degrees. In theory it would be possible to increase this angle by using a longer actuator and mounting it on extension arms away from the main portion of the mount, but this would involve a considerable increase in both cost and size of the mount. Some mounts have appeared on the market using a cog and worm drive to increase the steerable angle of the dish, but in cheaper mounts the wear which inevitably takes place results in unacceptable slackness well before the normal life of the dish has expired. Again, this can only be overcome at increased cost.

SUMMARY OF THE INVENTION

An aim of the present invention is to increase the

steerable angle of the antenna without any significant increase in cost or reduction in the useful life of the mount.

There is now provided by the present invention a motorised mount for a dish antenna comprising a stationary portion, a mount member for rigid attachment to the dish and pivotally coupled to the stationary portion for rotation in a first plane, first and second lever arms pivotally coupled together and extending generally parallel to the said plane, the first lever arm additionally being pivotally coupled to a place which is fixed relative to the mount member in use, and the second lever arm additionally being pivotally coupled to the stationary portion, and a motorised actuator ram pivotally coupled between the second lever arm and the stationary portion.

With such an arrangement the dish can be moved through an arc of about 180 degrees using a relatively short actuator ram.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is exemplified in the accompanying drawings in which:

Figure 1 is a perspective view of a motorised mount of the invention,

Figure 2 is a diagrammatic plan view of the mount showing the mount member at one end of its travel,

Figure 3 is a similar view to Fig. 2 but showing the mount member at the other end if its travel, and

Figure 4 is a similar view to Fig. 2 but shows a different mount of the invention.

DETAILED DESCIPTION OF THE DRAWINGS

In the drawings the invention is shown applied to a polar mount of known form for a satellite-receiving dish antenna, but it will be appreciated that the invention could be applied to any kind of steerable mount for a dish antenna.

Briefly, the illustrated mount comprises a box-section post 1 mounted on a fixed upright pole 2. An intermediate member 3 is mounted on the post 1 for rotation about a horizontal pivot 4, and a mount member 5 is in turn mounted on the intermediate member 3 for rotation about an axis 6 which is perpendicular to the axis of pivot 4. A mounting head 7 is bolted centrally to the rear face of a dish antenna 8, and the head 7 is in turn secured to the front end of the mount member 5 for rotation about a further horizontal pivot 9. A threaded rod 10 is pivotally coupled to the head 7 and extends through a flange 11 upstanding from the front of the mount member 5 to receive a nut 12.

A cranked plate 15 extends rearwardly from the intermediate member 3 and a threaded rod 16 is pivotally coupled to the plate 15 to pass through a sleeve 17 secured to the post 1. Locking nuts 19, 20

are threaded onto the rod 16 at each end of the sleeve 17. An arm 21 is rigidly secured to the cranked plate 15 for mounting a motorised actuator ram indicated generally at 23. The actuator comprises an electric motor 24 which moves an actuator arm 25 in and out of a tubular housing 26 which is pivotally connected to the mounting arm 21 via a coupling 27.

As thus far described the polar mount is of known construction, and to understand the invention better the way in which it is set up and used will first be briefly described.

The dish is first rotated (e.g. by rotating the pole 2) until it points south. The nuts 19, 20 are then threaded along the rod 16 to rotate the mount member 5 and the intermediate member 3 together about the horizontal pivot 4 until the mount member is set to the required angle of elevation, whereupon the nuts 19 and 20 are tightened onto the sleeve 17. Thus, once this adjustment is made, the portion of the assembly comprising intermediate member 3 and its attached plate 15 together with the motor mounting arm 21 is, for the purposes of the invention, fixed. Similarly, once the angle of declination has been set by screwing the nut 12 along the rod 10 to adjust the angle of the head 7 relative to the mount member 5 about pivot 9, the dish is again, for present purposes, fixed relative to the mount member 5.

Once these initial adjustments have been made the dish can be steered about axis 6 relative to the fixed portion of the assembly to move in a plane perpendicular to the axis 6. This is achieved by the

actuator ram 23 which is directly coupled to the dish, or to an extension arm fixed with the head 7. However, in accordance with the present invention the inner end of a first lever arm 31 is pivotally coupled at 32 to the upper face of the mount member 5 to rotate about an axis which is parallel to the axis 6. The opposite end of this arm is pivotally coupled at 33 to the outer end of a second lever arm 34, the inner end of which is pivotally coupled at 35 to the upper face of the cranked plate 15. The axes of pivots 33 and 35 are both substantially parallel to axis 6. The free end of the actuator arm 25 is coupled to the outer pivot 33 by a swivel coupling.

Although the range of movement of the actuator arm 25 is relatively short the dish is now able to swing through an arc of about 180 degrees or more. The way in which this is achieved is shown diagrammatically in Fig.s 2 and 3. In these Fig.s the lever arms are shown on the opposite side of the mount member 5 to Fig. 1 but they can be mounted in either position. Also, for simplicity the ram, represented in chain dash, is shown connected directly to the cranked plate 15, but again this is not important.

Fig. 2 shows the actuator ram fully retracted so that the lever arms lie relatively close to the cranked plate 15 and the mount member 5 is perpendicular to the cranked plate on the same side as the actuator. However, as the actuator arm is extended the lever arms move further apart and the first lever arm urges the mount member clockwise as shown about pivot axis 6. Further extension of the ram causes the lever arms to move together again as the mount member is turned to

the opposite side of the cranked plate 15 as shown in Fig. 3. Towards the latter part of this movement the mount member 5 will tend to move faster than in the earlier part, but this will not usually be much of a disadvantage.

If required, spring means could be included acting between a movable part such as the mount member 5 and a fixed part such as the cranked plate 15 (e.g. points A and B in Fig. 2) so as to bias the mount member towards the position which it occupies when the ram is retracted. This may overcome any free play between the fixed and movable parts.

The ram could in fact be coupled to any position along the second lever arm 34.

The mount of Fig. 4 differs from that of Fig.s 1 to 3 in that somewhat longer lever arms 31' and 34' are employed. The lever arms are also coupled to the mount member 5 and the fixed plate 15 at new positions 32' and 35' further from the axis of rotation 6 of the dish. Instead of being coupled to the pivot 33 the actuator arm of the ram 23 is now coupled to a new pivot point 36 part way along the second lever arm 34'. The tubular housing 26 is pivotally mounted about the pivot axis 6 by means of a coupling 27'. This modified mount again allows the dish to be moved through a wide angle by the actuator ram.

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CLAIMS

1. A motorised mount for a dish antenna, comprising a stationary portion, a mount member for rigid attachment to the dish and pivotally coupled to the stationary portion for rotation in a plane, first and second lever arms pivotally coupled together and extending generally parallel to the said plane, the first lever arm additionally being pivotally coupled to a place which is fixed relative to the mount member in use, and the second lever arm additionally being pivotally coupled to the stationary portion, and a motorised actuator ram pivotally coupled between the second lever arm and the stationary portion.

2. A motorised mount for a dish antenna, which includes spring means acting between the mount member and the stationary portion so as to bias the mount member towards a position which it occupies when the actuator ram is retracted.

3. A motorised mount for a dish antenna, substantially as described with reference to the accompanying drawings.

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